IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants:	Michael R. Smith, Ali Golshan, Jeffrey YM Wang		
Assignee:	Cisco Technology, Inc.		
Title:	Interface Bundles in Virtual Network Devices		
Application No.:	10/782,314	Filing Date:	February 19, 2004
Examiner:	Ryan J. Jakovac	Group Art Unit:	2445
Docket No.:	CIS0211US	Confirmation No.:	7633

Austin, Texas
November 22, 2010

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

This brief is submitted in support of Appellant's Notice of Appeal, which was received at the Office on September 20, 2010, thus allowing Appellant until November 22, 2010 (November 20, 2010 having been a Saturday) to file this Appeal Brief. Please charge deposit account No. 502306 for the fee of $540.00 associated with this Appeal Brief. Please also charge this deposit account for any additional extensions of time or any other fees that are required for this appeal.

I. REAL PARTY IN INTEREST

The real party in interest on this appeal is Cisco Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this application.

III. STATUS OF CLAIMS

Claims 1-3, 5-17, 19-27, and 38-67 are pending in the application. No claims have been withdrawn. No claims have been cancelled.

Claims 1-3, 5-17, 19-27, and 38-67 stand rejected in the final Office Action dated May 21, 2010 (Office Action).

Appellant appeals the final rejection of claims 1-3, 5-17, 19-27, and 38-67.

IV. STATUS OF AMENDMENTS

No other amendments were filed subsequent to the final rejection of May 21, 2010

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 sets forth a system (e.g., as shown in FIG. 2A and described at page 8, lines 6-14 of the specification). The system comprises a virtual link bundle (e.g., virtual link bundle 250(1) of FIG. 2A, as described at page 8, lines 15-18 of the specification) comprising a plurality of communication links. The plurality of communication links is configured to couple (e.g., as described at page 8, lines 9-10 of the specification) a virtual network device (e.g., virtual network device 202 of FIG. 2A, as described at page 8, lines 7-9 of the specification) to a first network device external to the virtual network device (e.g., network device 120(1) of FIG. 2A, as described at page 8, lines 6-7 of the specification). A first end of each of the communication links is configured to be coupled (e.g., as described at page 8, lines 9-11 of the specification) to the first network device. A second end of a first one of the communication links is configured to be coupled (e.g., as described at page 8, lines 25-29 of the specification) to a first virtual network device sub-unit (e.g., network device 122(1) of FIG. 2A, as described at page 8, lines 6-9 of the specification) within the virtual network device. A second end of a second one of the communication links is configured to be coupled (e.g., as described at page 8, lines 25-29 of the specification) to a second virtual network device sub-unit (e.g., network device unit 122(2) of FIG. 2A, as described at page 8, lines 6-9 of the specification) within the virtual network device. The first one of the communication links and the second one of the communication links provide redundant connections (e.g., as described at page 8, lines 11-14 of the specification) between the first network device and the virtual network device. The first network device comprises a plurality of ports (e.g., port P1 of FIG. 5A, as described at page 21, lines 25-28 of the specification). Each of the ports is configured to communicate (e.g., as described at page 22, lines 13-14 of the specification) packets with a respective client (e.g., client 102(1) of FIG. 5A, as described at page 22, lines 12-15 of the specification). The first network device is configured to append (e.g., as described at page 23, lines 2-3 of the specification) a header to a packet before sending the packet to the virtual network device via one of the communication links. The header identifies (e.g., as described at page 23, lines 3-4 of the specification) a one of the ports having received the packet.

Independent claim 8 sets forth a system (e.g., as shown in FIG. 2A and described at page 8, lines 6-14 of the specification). The system comprises a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the

specification) comprising a first interface (e.g., interface 320(13) of FIG. 3, as described at page 12, line 11 of the specification) and a controller (e.g., control card 302(1) of FIG. 3, as described at page 11, lines 28-31 of the specification) coupled to the first interface. The controller is and configured to forward (e.g., as described at page 14, lines 22-32 of the specification) packets received via the first interface. The first interface is identified (e.g., as described at page 14, lines 7-9 of the specification) by a first logical identifier. A second interface (e.g., interface 320(16) of FIG. 3, as described at page 12, line 16 of the specification) is identified (e.g., as described at page 14, lines 7-9 of the specification) by the first logical identifier. An interface bundle (e.g., as described at page 14, line 3 of the specification) comprises the first interface and the second interface. The second interface is comprised in a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification). The controller is configured to detect (e.g., as described at page 17, lines 17-32 of the specification) whether a packet was received via a virtual network device link (e.g., virtual network device link 360 of FIG. 3, as described at page 13, lines 1-7 of the specification). A first end of the virtual network device link is configured to be coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to the first virtual network device sub-unit. A second end of the virtual network device link is configured to be coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to the second virtual network device sub-unit. The first interface is configured to filter out (e.g., as described at page 17, lines 17-32 of the specification) the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

Independent claim 19 sets forth a system (e.g., as shown in FIG. 2A and described at page 8, lines 6-14 of the specification). The system comprises a virtual link bundle (e.g., virtual link bundle 250(1) of FIG. 2A, as described at page 8, lines 15-18 of the specification). The system also comprises a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification). The first virtual network device sub-unit is configured to detect (e.g., as described at page 17, lines 17-32 of the specification) whether a packet was received via a virtual network device link (e.g., virtual network device link 360 of FIG. 3, as described at page 13, lines 1-7 of the specification). A first end of the virtual network device link is configured to be coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to the first virtual network device sub-unit. A

second end of the virtual network device link is configured to be coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to the second virtual network device sub-unit. The system includes a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification). A first interface (e.g., interface 320(13) of FIG. 3, as described at page 12, line 11 of the specification) of the first virtual network device sub-unit is coupled (e.g., as shown in FIG. 3 and as described at page 12, lines 6-7 of the specification) to the virtual link bundle. A second interface (e.g., interface 320(16) of FIG. 3, as described at page 12, lines 15-18 of the specification) of the second virtual network device sub-unit is coupled (e.g., as described at page 12, lines 15-18 of the specification) to the virtual link bundle. Each of the first interface and the second interface is identified by a first logical identifier (e.g., as described at page 14, lines 7-9 of the specification). The first interface is configured to filter out (e.g., as described at page 17, lines 17-32 of the specification) the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

Independent claim 38 sets forth a method that involves sending (e.g., as described at page 13, line 16 of the specification) a first packet via a first link of a virtual link bundle (e.g., virtual link bundle 250(1) of FIG. 3, as described at page 11, lines 9-12 of the specification) if a destination identifier associated with the first packet is associated (e.g., as described at page 11 lines 9-12 of the specification) with the virtual link bundle. The method also involves sending (e.g., as described at page 11, lines 12-14 of the specification) a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle where the destination identifier associated with the first packet and second packet identify the same destination, the first link is coupled to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification), and the second link is coupled to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification).

Independent claim 41 sets forth a method that involves receiving (e.g., as described at page 17, lines 17-20 of the specification) a packet where a destination identifier for the packet identifies (e.g., as described at page 17, line 9 of the specification) an interface bundle (e.g., as described at page 14, line 3 of the specification), and the interface bundle comprises a first

interface (e.g., interface 320(13) of FIG. 3, as described at page 12, line 11 of the specification). The method also involves detecting (e.g., as described at page 17, lines 17-32 of the specification) whether a packet was received via a virtual network device link (e.g., virtual network device link 360 of FIG. 3, as described at page 13, lines 1-7 of the specification), where a first end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification) and a second end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification). The method also involves filtering out (e.g., as described at page 17, lines 17-32 of the specification) the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

Independent claim 48 sets forth a system (e.g., as shown in FIG. 2A and described at page 8, lines 6-14 of the specification). The system includes a means (e.g., network device 120(1) of FIG. 3, as described at page 11, lines 9-14 of the specification) for sending (e.g., as described at page 13, line 16 of the specification) a first packet via a first link of a virtual link bundle (e.g., virtual link bundle 250(1) of FIG. 3, as described at page 11, lines 9-12 of the specification) if a destination identifier associated with the first packet is associated (e.g., as described at page 11 lines 9-12 of the specification) with the virtual link bundle. The system also includes a means (e.g., network device 120(1) of FIG. 3, as described at page 11, lines 9-14 of the specification) for sending (e.g., as described at page 11, lines 12-14 of the specification) a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle where the destination identifier associated with the first packet and second packet identify the same destination, the first link is coupled to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification), and the second link is coupled to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification).

Independent claim 51 sets forth a system (e.g., as shown in FIG. 2A and described at page 8, lines 6-14 of the specification). The system includes a means (e.g., control card 302(1) of

FIG. 3, as described at page 11, lines 28-31 of the specification) for receiving (e.g., as described at page 17, lines 17-20 of the specification) a packet where a destination identifier for the packet identifies (e.g., as described at page 17, line 9 of the specification) an interface bundle (e.g., as described at page 14, line 3 of the specification), and the interface bundle comprises a first interface (e.g., interface 320(13) of FIG. 3, as described at page 12, line 11 of the specification). The system also includes a means (e.g., control card 302(1) of FIG. 3, as described at page 11, lines 28-31 of the specification) for detecting (e.g., as described at page 17, lines 17-32 of the specification) whether a packet was received via a virtual network device link (e.g., virtual network device link 360 of FIG. 3, as described at page 13, lines 1-7 of the specification), where a first end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification) and a second end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification). The system also includes means (e.g., control card 302(1) of FIG. 3, as described at page 11, lines 28-31 of the specification) for filtering out (e.g., as described at page 17, lines 17-32 of the specification) the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

Independent claim 58 sets forth a computer readable medium (e.g., as described at page 27, lines 28-31 of the specification) storing (e.g., as described at page 27, lines 28-31 of the specification) program instructions executable to send (e.g., as described at page 13, line 16 of the specification) a first packet via a first link of a virtual link bundle (e.g., virtual link bundle 250(1) of FIG. 3, as described at page 11, lines 9-12 of the specification) if a destination identifier associated with the first packet is associated (e.g., as described at page 11 lines 9-12 of the specification) with the virtual link bundle. The instructions are further executable to send (e.g., as described at page 11, lines 12-14 of the specification) a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle where the destination identifier associated with the first packet and second packet identify the same destination, the first link is coupled to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at

page 10, lines 28-29 of the specification), and the second link is coupled to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification).

Independent claim 61 sets forth a computer readable medium (e.g., as described at page 27, lines 28-31 of the specification) storing (e.g., as described at page 27, lines 28-31 of the specification) program instructions executable to detect reception (e.g., as described at page 17, lines 17-20 of the specification) of a packet where a destination identifier for the packet identifies (e.g., as described at page 17, line 9 of the specification) an interface bundle (e.g., as described at page 14, line 3 of the specification), and the interface bundle comprises a first interface (e.g., interface 320(13) of FIG. 3, as described at page 12, line 11 of the specification). The instructions are further executable to detect (e.g., as described at page 17, lines 17-32 of the specification) whether a packet was received via a virtual network device link (e.g., virtual network device link 360 of FIG. 3, as described at page 13, lines 1-7 of the specification), where a first end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a first virtual network device sub-unit (e.g., virtual network device sub-unit 122(1) of FIG. 3, as described at page 10, lines 28-29 of the specification) and a second end of the virtual network device link is coupled (e.g., as described at page 12, line 19 to page 13, line 1 of the specification) to a second virtual network device sub-unit (e.g., virtual network device sub-unit 122(2) of FIG. 3, as described at page 10, lines 28-29 of the specification). The instructions are further executable to filter out (e.g., as described at page 17, lines 17-32 of the specification) the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Rejection of claims 1-3, 5-7 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over U.S. Publication No. 2001/0014097 by Beck, et al. ("Beck"), in view of TCP/IP Illustrated, Volume 1: The Protocols ("TCP/IP").

B. Rejection of claims 8-17, 19-20, 22-27, 38, 40-48, 50-58, 60-67 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over Beck, et al., in view of U.S. Publication No. 2005/0083933 by Fine, et al. ("Fine").

C. Rejection of claims 21, 39, 49 and 59 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over Beck, et al. and Fine, et al. in view of U.S. Patent No. 6,735,205 issued to Mankude, et al. ("Mankude").

VII. ARGUMENT

A. Rejection of claims 1-3, 5-7 under 35 U.S.C. § 103(a) as purportedly being unpatentable over Beck in view TCP/IP is unfounded.

In order for a claim to be rendered invalid under 35 U.S.C. §103, the subject matter of the claim as a whole would have to be obvious to a person of ordinary skill in the art at the time the invention was made. *See* 35 U.S.C. §103(a). The proposed combination of Beck and TCP/IP fails to disclose all elements of Appellants' claims. Additionally, the rejection fails to specify how the differences between the proposed combination and Appellants' claims would have been obvious, especially in light of the explicit teachings of the references. Accordingly, Appellants' claims are not obvious in view of the combination of Beck and TCP/IP.

Claim 1

In particular, the cited references fail to disclose a virtual link bundle comprising first and second communication links that provide redundant connections between a first network device and a virtual network device, as recited in claim 1. The Office Action states that Beck's FIGs. 2 and 7, as well as ¶ [0026] disclose the claimed features. Office Action, p. 6-7. The Office Action also states that providing redundant connections between networked elements is well known. *Id.*

The Office Action equates Beck's cluster with the claimed virtual network device and Beck's router with the claimed first network device and states that Beck discloses a plurality of communication links coupling the cluster and router. *Id.* Even if the Office Action's characterization were apt, a point Appellants do not concede, Appellants note that the Office Action appears to ignore the term "virtual link bundle." Merely disclosing a plurality of links is not the same as disclosing a virtual link bundle. The term bundle, as applied to links, is a term of art having a specific meaning to those of skill in the art. As described in the Specification, one of the objectives of the claimed invention is to overcome limitations in prior systems that use link bundling techniques. *See, e.g.*, Specification, ¶ [0005]. The Office Action's failure to address this term in the context of Beck (or TCP/IP) is unsurprising since neither Beck nor TCP/IP is directed to virtual link bundles. Instead, Beck is directed to making a cluster of nodes appear as a single node. Beck, Abstract. TCP/IP is simply a general overview of the TCP/IP protocol and is likewise silent in regards to virtual link bundles.

Given the failure of the cited references to disclose virtual link bundles, it follows that the cited references must also fail to disclose a virtual link bundle having the specific claimed features, such as providing redundant connections between a virtual network device and a first network device external to the virtual network device.

Claim 2

Appellants respectfully submit that the cited references fail to disclose a network device configured to select one of a plurality of communication links on which to send a packet. The Office Action cites Beck's sending a packet "to the network for delivery to a particular node" as disclosing this feature. Office Action, p. 8 (citing Beck, ¶ [0009]. However, Appellants respectfully note that Beck's ¶ [0009] refers to intra-cluster communications between nodes of a cluster, not communications over communications links between a network device and a virtual network device. Thus, even if this passage did disclose selecting a communications link, which Appellants maintain is not the case, such a communications link would only couple nodes within a cluster and accordingly would not be comparable to the claimed communications links, which couple a network device to a virtual network device. Furthermore, Appellants respectfully submit that while the cited portion of Beck may disclose selecting a particular node, the cited portions fail to disclose multiple communications links connected to the node and a network device configured to select one of the multiple communications links. Appellants note that TCP/IP is not cited as purportedly disclosing these features and respectfully submit that TCP/IP fails to do so, alone or in combination with Beck.

Claim 7

Appellants respectfully submit that the cited passages of Beck and TCP/IP fail to disclose multiple communications links configured to be managed as a single link. The Office Action states that Beck's disclosure of using cluster aliases to make a cluster appear as a single node discloses this feature. Office Action, p. 9. Appellants respectfully submit that such disclosure is irrelevant to the claimed feature. Even if Beck's cluster does appear to be a single node, that says nothing about the number of links connected to the cluster or the configuration of those links. Appellants note that TCP/IP is not cited as purportedly disclosing these features and respectfully submit that TCP/IP fails to do so, alone or in combination with Beck..

For at least the foregoing reasons, claims 1, 2, and 7 are patentable over the cited references. Claims 3 and 6 are patentable at least by virtue of depending from an allowable base claim. Accordingly, Appellants respectfully request that the Board reverse the rejections of these claims.

B. Rejection of claims 8-17, 19-20, 22-27, 38, 40-48, 50-58, 60-67 under 35 U.S.C. § 103(a) as purportedly being unpatentable over Beck in view of Fine is unfounded.

Claim 8

Appellants respectfully submit that the cited references fail to disclose a first and second interface that are both identified by a first logical identifier, as recited in claim 8. The Office Action states this feature is somehow disclosed by Beck's FIG. 2 and ¶ [0027]. Office Action, p. 9. Beck's ¶ [0027] describes how multiple nodes in a multi-node cluster can be referred to by a cluster alias and then redirect packets to a specific node. Appellants note that the cited portions of Beck fail to include any explicit reference to any type of interface, much less one comparable to the claimed interfaces.

The Office Action states that "interfaces are associated with an IP address." *Id.* Even if the cited portions Beck did disclose a first and second interface, a point Appellants do not concede, each of Beck's processor nodes has a unique 32- bit IP address (S1.A, S1.B, and S1.C). *See* Beck, FIG. 2 and ¶ [0026]. Thus, Beck's processor nodes, which the Office Action appears to equate with the claimed interfaces, is associated with a unique address. Therefore, Beck fails to disclose a first and second interface that are both identified by the same logical identifier (the first logical identifier of claim 8).

Appellants respectfully submit that the cited portions of Beck also fail to disclose an interface bundle, as recited by claim 8. The Office Action states that Beck "discloses a grouping of processor nodes called a cluster with interconnected communication links." Office Action, p. 9. Appellants respectfully submit that a grouping of processor nodes is not comparable to an interface bundle and does not require an interface bundle. That is, a cluster of nodes is not the same as a bundle of interfaces. While a cluster can include multiple interfaces (e.g., one or more per node), the cluster need not (and in Beck's case does not) bundle the interfaces. Given this

fact, and the fact that Beck makes no explicit reference whatsoever to an interface bundle, Appellants respectfully submit that this feature is not disclosed by the cited portions of Beck. Appellants note that Fine is not cited as purportedly disclosing these features and respectfully submit that Fine fails to do so, alone or in combination with Beck..

Claim 17

Appellants respectfully submit that the cited references fail to disclose a virtual network device sub-unit configured to learn that a source address of a packet is behind an interface on a separate virtual network device sub-unit, in response to receiving the packet via a virtual network device link, as claimed. The Office Action cites Beck's ¶¶ [0009] and [0039]-[0041] (with respect to claim 47, which has substantially similar features as claim 17) as purportedly disclosing a these features. Office Action, pp. 13 and 21.

Appellants note that the packets referred to in Beck's ¶ [0039]-[0041] are packets addressed to the cluster alias. This means that the packets referred to are received from an external router, and not from another processor node within the cluster. Thus, the packets are not received via an intra-cluster communications link. On the other hand, claim 17 recites receiving packets via a virtual device network link, which has a first end coupled to a first virtual network device sub-unit and a second end coupled to a second virtual network device sub-unit.

Furthermore, the cited passages refer to detecting a destination of a packet, not to learning the source of a packet. *See, e.g.*, Beck ¶ [0039] ("the skinny stack application determines a processor node…to which the packet will be transferred."). (emphasis supplied) On the other hand, claim 17 explicitly recites the virtual network device sub-unit is configured to learn a source address of a packet. Since the cited passages refer to detecting destination addresses and claim 17 refers to learning source addresses, Appellants respectfully submit the cited passages fail to disclose each element of claim 17. Appellants note that Fine is not cited as purportedly disclosing these features and respectfully submit that Fine fails to do so, alone or in combination with Beck..

Claim 23

Appellants respectfully submit that the cited references fail to disclose a virtual network device sub-unit configured to prioritize sending a packet via a first interface of an interface bundle over sending the packet via a second interface of the interface bundle. The Office Action

cites portions of Beck as purportedly disclosing this feature, stating that Beck discloses that if one processor node crashes, another takes over. Office Action, p. 15. The cited portions of Beck disclose that when first processor node having a first address fails, a second processor node having a second address and a third processor node having a third address decide which (the second or third) processor node will acquire the address of the failed processor node. *See* Beck ¶ [0076]. This is not comparable to claim 23. This is a selection of which processor node will be used to send a packet, where the processor nodes have distinct (non-identical) identifiers. Furthermore, once the selection of which processor node will adopt the failed processor node's address is made, the packets are sent by that processor node. That is, no selection between interfaces is made in Beck once the failover completes. On the other hand, claim 23 recites features of a system configured to select between sending a packet over a first interface and sending the packet over a second interface where both the interfaces are identified by the same identifier. Appellants respectfully submit that the cited portions of Beck do not disclose such features. Appellants note that Fine is not cited as purportedly disclosing these features and respectfully submit that Fine fails to do so, alone or in combination with Beck..

Claims 8, 17, and 23 are patentable for at least the foregoing reasons. Claims 19, 38, 41, 48, 51, 58, and 61 recite substantially similar features as claims 1 and 8 and are similarly patentable. Furthermore, claims 9-17, 20, 22-27, 40, 42-47, 50, 52-57, 60, and 62-67 are patentable at least by virtue of depending from allowable independent claims. Accordingly, Appellants respectfully request that the Board reverse the rejections of these claims.

C. Rejection of claims 21, 39, 49 and 59 under 35 U.S.C. § 103(a) as purportedly being unpatentable over Beck and Fine in view Mankude is unfounded.

These claims are patentable at least by virtue of depending from allowable base claims. Accordingly, Appellants respectfully request that the Board reverse the rejections of these claims.

CONCLUSION

Appellant respectfully submits that claims 1-23 are allowable for at least the above-stated reasons. Appellant respectfully requests that the Board reverse the rejections of these claims.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Appellant hereby petitions for such extensions. Appellant also hereby authorizes that any fees due for such extensions or any other fee associated with this submission, as specified in 37 C.F.R. §§ 1.16 or 1.17, be charged to deposit account 502306.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (Previously Presented) A system comprising:

a virtual link bundle comprising a plurality of communication links, wherein

the plurality of communication links is configured to couple a virtual network device to a first network device external to the virtual network device;

a first end of each of the communication links is configured to be coupled to the first network device;

a second end of a first one of the communication links is configured to be coupled to a first virtual network device sub-unit within the virtual network device;

a second end of a second one of the communication links is configured to be coupled to a second virtual network device sub-unit within the virtual network device;

the first one of the communication links and the second one of the communication links provide redundant connections between the first network device and the virtual network device;

the first network device comprises a plurality of ports;

each of the ports is configured to communicate packets with a respective client;

the first network device is configured to append a header to a packet before sending the packet to the virtual network device via one of the communication links; and

the header identifies a one of the ports having received the packet.

2. (Original) The system of claim 1, further comprising the first network device, wherein

the first network device is configured to select a communication link of the plurality of communication links on which to send a particular packet.

3. (Original) The system of claim 2, wherein

each packet sent between the virtual network device and the first network device is sent via only a one of the communication links.

4. (Canceled)

5. (Original) The system of claim 1, further comprising the first virtual network device sub-unit, wherein

the first virtual network device sub-unit is configured to identify whether a one of the communication links is coupled to another virtual network device sub-unit within the virtual network device.

6. (Original) The system of claim 1, further comprising the first virtual network device sub-unit and the second virtual network device sub-unit, wherein

the first virtual network device sub-unit and the second virtual network device sub-unit are configured to communicate packets with each other via a virtual network device link.

7. (Original) The system of claim 1, wherein

the communication links are configured to be managed as a single link.

8. (Previously Presented) A system comprising:

a first virtual network device sub-unit comprising:

a first interface; and

a controller coupled to the first interface and configured to forward packets received via the first interface, wherein

the first interface is identified by a first logical identifier,

a second interface is identified by the first logical identifier,

an interface bundle comprises the first interface and the second interface,

the second interface is comprised in a second virtual network device sub-unit,

the controller is configured to detect whether a packet was received via a virtual network device link,

a first end of the virtual network device link is configured to be coupled to the first virtual network device sub-unit,

a second end of the virtual network device link is configured to be coupled to the second virtual network device sub-unit, and

the first interface is configured to filter out the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

9. (Original) The system of claim 8, further comprising the second virtual network device sub-unit.

10. (Original) The system of claim 9, wherein

the first virtual network device sub-unit is configured to maintain consistent forwarding information with the second virtual network device sub-unit.

11. (Original) The system of claim 10, wherein

the controller is configured to perform control protocol processing for the first interface according to a routing protocol running on the interface bundle,

the controller is configured to provide information generated when performing the control protocol processing to a secondary controller comprised in the second virtual network device sub-unit, and

the secondary controller is configured to use the information to manage the second interface.

12. (Previously Presented) The system of claim 8, wherein

the controller is configured to lookup a destination address of a first packet in a lookup table, and

if the lookup table returns the first logical identifier, the first virtual network device sub-unit is configured to prioritize sending the first packet via the first interface over sending the first packet via the second interface.

13. (Previously Presented) The system of claim 12, wherein

if the lookup table returns the first logical identifier, the first virtual network device sub-unit is configured to send the first packet via the first interface instead of sending the packet via the second interface, unless one or more of the first interface and a link coupled to the first interface are failed.

14. (Original) The system of claim 13, wherein
the first virtual network device sub-unit comprises a plurality of interfaces,
more than one of the interfaces are each comprised in the interface bundle, and
the more than one of the interfaces comprises the first interface.

15. (Previously Presented) The system of claim 14, wherein
if each respective communication link coupled to the more than one of the interfaces fails, the first virtual network device sub-unit is configured to forward the first packet via the second interface comprised in the second virtual network device sub-unit.

16. (Original) The system of claim 8, wherein
the first virtual network device sub-unit is coupled to the second virtual network device sub-unit by a virtual network device link.

17. (Previously Presented) The system of claim 16, wherein
the first virtual network device sub-unit is configured to learn that a source address of a second packet is behind the first interface, in response to receiving the second packet via the virtual network device link.

18. (Canceled)

19. (Previously Presented) A system comprising:
a virtual link bundle;
a first virtual network device sub-unit, wherein

the first virtual network device sub-unit is configured to detect whether a packet was received via a virtual network device link,

a first end of the virtual network device link is coupled to the first virtual network device sub-unit,

a second end of the virtual network device link is coupled to a second virtual network device sub-unit; and

the second virtual network device sub-unit, wherein

a first interface of the first virtual network device sub-unit is coupled to the virtual link bundle,

a second interface of the second virtual network device sub-unit is coupled to the virtual link bundle,

each of the first interface and the second interface is identified by a first logical identifier, and

the first interface is configured to filter out the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

20. (Original) The system of claim 19, further comprising:

a network device coupled to the first virtual network device sub-unit and the second virtual network device sub-unit by the virtual link bundle.

21. (Original) The system of claim 20, wherein

the network device is configured to use a hash-based load-sharing algorithm to select one of a plurality of communication links comprised in the virtual link bundle, and

the network device is configured to send a packet via the selected one of the communication links.

22. (Original) The system of claim 19, wherein

a primary controller comprised in the first virtual network device sub-unit is configured to perform control protocol processing for the first interface according to a routing protocol running on the virtual link bundle,

the primary controller is configured to send information generated by performing the control protocol processing to a secondary controller comprised in the second virtual network device sub-unit, and

the secondary controller is configured to use the information to manage the second interface.

23. (Original) The system of claim 19, wherein

the first virtual network device sub-unit is configured to lookup a destination address of a packet in a lookup table, and

if the lookup table returns the first logical identifier, the first virtual network device sub-unit is configured to prioritize sending the packet via the first interface over sending the packet via the second interface.

24. (Original) The system of claim 23, wherein

each of a plurality of interfaces comprised in the first virtual network device sub-unit is coupled to a respective communication link comprised in the virtual link bundle, and

the interfaces comprise the first interface.

25. (Original) The system of claim 24, wherein

if each respective communication link coupled to the interfaces fails, the first virtual network device sub-unit is configured to send the packet via the second interface comprised in the second virtual network device sub-unit.

26. (Original) The system of claim 23, wherein

the first virtual network device sub-unit is coupled to the second virtual network device sub-unit by a virtual network device link.

27. (Original) The system of claim 26, wherein

the first network device is configured to learn that a source address of a packet is behind the first interface, in response to receiving the packet via the virtual network device link.

28-37. (Canceled)

38. (Previously Presented) A method comprising:

sending a first packet via a first link of a virtual link bundle if a destination identifier associated with the first packet is associated with the virtual link bundle; and

sending a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle, wherein

the destination identifier associated with the first packet identifies a destination,

the destination identifier associated with the second packet identifies the destination,

the first link is coupled to a first virtual network device sub-unit, and

the second link is coupled to a second virtual network device sub-unit.

39. (Original) The method of claim 38, further comprising:

selecting the first link from a plurality of links comprised in the virtual link bundle, wherein

the selecting comprises performing a hash-based algorithm.

40. (Original) The method of claim 39, further comprising:

appending a header to the first packet, wherein

the header identifies which port of a plurality of ports received the first packet, and

the sending the first packet via the first link comprises sending the header via the first link.

41. (Previously Presented) A method comprising:

receiving a packet, wherein

a destination identifier for the packet identifies an interface bundle, and

the interface bundle comprises a first interface; and

detecting whether the packet was received via a virtual network device link, wherein

a first end of the virtual network device link is coupled to a first virtual network device sub-unit,

a second end of the virtual network device link is coupled to a second virtual network device sub-unit;

filtering out the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

42. (Original) The method of claim 41, further comprising:

sending the packet via the first interface if the packet was not received via the virtual network device link.

43. (Previously Presented) The method of claim 42, further comprising:

maintaining consistency between a lookup table comprised in the first virtual network device sub-unit and a second lookup table comprised in the second virtual network device sub-unit.

44. (Original) The method of claim 42, further comprising

performing control protocol processing for the interface bundle at a primary controller comprised in a first virtual network device sub-unit, wherein

the first interface is comprised in the first virtual network device sub-unit.

45. (Original) The method of claim 44, further comprising:

managing a second interface of the second virtual network device sub-unit in response to information generated by the performing the control protocol processing, wherein

the second interface is comprised in the interface bundle.

46. (Original) The method of claim 45, further comprising:
looking up a destination address of a second packet in a lookup table, and
if the lookup table returns the destination identifier, sending the sending packet via the first interface of the first virtual network device sub-unit instead of sending the packet via the second interface of the second virtual network device sub-unit.

47. (Original) The method of claim 41, further comprising:
learning that a source address of the packet is behind a local interface, in response to receiving the packet via the virtual network device link.

48. (Previously Presented) A system comprising:
means for sending a first packet via a first link of a virtual link bundle if a destination identifier associated with the first packet is associated with the virtual link bundle; and
means for sending a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle, wherein
the destination identifier associated with the first packet identifies a destination,
the destination identifier associated with the second packet identifies the destination,
the first link is coupled to a first virtual network device sub-unit, and
the second link is coupled to a second virtual network device sub-unit.

49. (Original) The system of claim 48, further comprising:
means for selecting the first link from a plurality of links comprised in the virtual link bundle, wherein
the selecting comprises performing a hash-based algorithm.

50. (Original) The system of claim 49, further comprising:
means for appending a header to the first packet, wherein

the header identifies which port of a plurality of ports received the first packet, and

the sending the first packet via the first link comprises sending the header via the first link.

51. (Previously Presented) A system comprising:

means for receiving a packet, wherein

a destination identifier for the packet identifies an interface bundle, and

the interface bundle comprises a first interface; and

means for detecting whether the packet was received via a virtual network device link, wherein

a first end of the virtual network device link is coupled to a first virtual network device sub-unit,

a second end of the virtual network device link is coupled to a second virtual network device sub-unit;

means for filtering out the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

52. (Original) The system of claim 51, further comprising:

means for sending the packet via the first interface if the packet was not received via the virtual network device link.

53. (Original) The system of claim 52, further comprising:

means for maintaining consistency between a lookup table comprised in a first virtual network device sub-unit and a second lookup table comprised in a second virtual network device sub-unit.

54. (Original) The system of claim 52, further comprising

means for performing control protocol processing for the interface bundle at a primary controller comprised in a first virtual network device sub-unit, wherein

the first interface is comprised in the first virtual network device sub-unit.

55. (Original) The system of claim 54, further comprising:

means for managing a second interface of the second virtual network device sub-unit in response to information generated by the performing the control protocol processing, wherein

the second interface is comprised in the interface bundle.

56. (Original) The system of claim 55, further comprising:

means for looking up a destination address of a second packet in a lookup table, and

means for sending the sending packet via the first interface of the first virtual network device sub-unit instead of sending the packet via the second interface of the second virtual network device sub-unit if the lookup table returns the destination identifier.

57. (Original) The system of claim 51, further comprising:

means for learning that a source address of the packet is behind a local interface, in response to receiving the packet via the virtual network device link.

58. (Previously Presented) A computer readable medium comprising program instructions executable to:

send a first packet via a first link of a virtual link bundle if a destination identifier associated with the first packet is associated with the virtual link bundle; and

send a second packet via a second link of the virtual link bundle if a destination identifier associated with the second packet is associated with the virtual link bundle, wherein

the destination identifier associated with the first packet identifies a destination,

a destination identifier associated with the second packet identifies the destination,

the first link is coupled to a first virtual network device sub-unit, and

the second link is coupled to a second virtual network device sub-unit.

59. (Original) The computer readable medium of claim 58, wherein the program instructions are further executable to:

select the first link from a plurality of links comprised in the virtual link bundle, wherein

selecting the first link from the plurality of links comprises performing a hash-based algorithm.

60. (Original) The computer readable medium of claim 59, wherein the program instructions are further executable to:

append a header to the first packet, wherein

the header identifies which port of a plurality of ports received the first packet, and

sending the first packet via the first link comprises sending the header via the first link.

61. (Previously Presented) A computer readable medium comprising program instructions executable to:

detect reception of a packet, wherein

a destination identifier for the packet identifies an interface bundle, and

the interface bundle comprises a first interface; and

detect whether the packet was received via a virtual network device link, wherein

a first end of the virtual network device link is coupled to a first virtual network device sub-unit,

a second end of the virtual network device link is coupled to a second virtual network device sub-unit;

filter out the packet from a packet flow being sent via the first interface if the packet was received via the virtual network device link.

62. (Original) The computer readable medium of claim 61, wherein the program instructions are further executable to:

send the packet via the first interface if the packet was not received via the virtual network device link.

63. (Original) The computer readable medium of claim 62, wherein the program instructions are further executable to:

maintain consistency between a lookup table comprised in a first virtual network device sub-unit and a second lookup table comprised in a second virtual network device sub-unit.

64. (Previously Presented) The computer readable medium of claim 62, wherein the program instructions are further executable to:

perform control protocol processing for the interface bundle at a primary controller comprised in the first virtual network device sub-unit, wherein
the first interface is comprised in the first virtual network device sub-unit.

65. (Previously Presented) The computer readable medium of claim 64, wherein the program instructions are further executable to:

manage a second interface of a second virtual network device sub-unit in response to information generated by performing the control protocol processing, wherein the second interface is comprised in the interface bundle.

66. (Original) The computer readable medium of claim 65, wherein the program instructions are further executable to:

look up a destination address of a second packet in a lookup table, and

if the lookup table returns the destination identifier, send the sending packet via the first interface of the first virtual network device sub-unit instead of sending the packet via the second interface of the second virtual network device sub-unit.

67. (Original) The computer readable medium of claim 61, wherein the program instructions are further executable to:

learn that a source address of the packet is behind a local interface, in response to detecting reception of the packet via the virtual network device link.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.